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Personal Learning Environments: A Solution for Self-Directed Learners

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Abstract In this paper I discuss *personal learning environments* and their diverse benefits, uses, and implications for life-long learning. Personal Learning Environments (PLEs) are Web 2.0 and social media technologies that enable individual learners the ability to manage their own learning. Self-directed learning is explored as a foundation for the use of PLEs. I outline the optimal criteria for social media tools to be used as PLEs: they must be easy to use, open, dynamic, and offer collaboration options. I discuss individual PLE tools with examples and possible uses. I list implications for educators and individual learners. I conclude the discussion with ideas for future study of PLEs in formal and informal learning.

A study of intelligent, famous, or successful people in history would include a group who became so without the advantage of formal education, but were self-directed learners. Leonardo Da Vinci, William Shakespeare, Charles Dickens, Louis L'Amour, and Abraham Lincoln are among the list. Modern self-directed learners Steven Spielberg, Russell Crowe, Steve Irwin, and Bill Gates have constructed their success without completing a formal college education. How have artists, authors, business tycoons, inventors, philosophers, and scientists throughout history been able to succeed without a diploma or degree? More importantly, how can we follow their examples personally and show those we teach how to cultivate their own learning? What tools are available to facilitate self-directed learning? How can learners carry, control, and organize their own learning from one topic to another, from one course to another and from one year to another for the rest of their lives?

Answering these questions completely could take a lifetime of study, so I will just handle a few highlights in this paper. Some of the success of self-directed learners is due to intrinsic motivation. Another part is the opportunity for learning. A third portion is the environment, tools, and technology each was given or created for him-or-herself in which to explore or create. This paper will focus on this last area. Let us begin with self-directed learning (SDL) to build a foundation upon which I will explore personal learning environments (PLEs). Armed with what PLEs are and how to use them, I will discuss the reasons to consider using a PLE for SDL and other teaching and learning situations.

Self-Directed Learning

What is SDL? It is the practice of studying a topic with little or no direction from formal education. The focus of SDL is that the learner decides and organizes all aspects of the learning to fit their need (Knowles 1975). The concept of SDL is not new to humanity. The ancient Greeks used the word autodidaktikos, from autós meaning self, and didaktikos meaning teaching. The modern equivalent is autodidactic, or self-taught. How are learning and teaching related? In 1680, John Amos Comenius coined the terms didactics, the science of teaching and mathetics, and the science of learning, as

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opposing forces. Modern SDL theorist Malcolm Knowles (1975) refers to "teachers, tutors, resource people, and peers" as "helpers". Modern education focuses on teaching and learning as a collaborative approach and puts learning and teaching as opposing ends of an exchange of information.

What does SDL look like? What are its defining characteristics? In defining SDL, Knowles (1970, p.7) as quoted in Hase and Kenyon (2001) puts the greater responsibility on the learner:

> Individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing learning strategies and evaluating learning outcomes.

Hase and Kenyon (2001) go further by referring to "self-determined learning" as their term: heutagogy. According to Hase and Kenyon (2001), "A heutagogical approach recognizes the need to be flexible in the learning where the teacher provides resources but the learner designs the actual course he or she might take by negotiating the learning". Rather than the "teacher who decided what the learner needed to know", heutagogy acknowledges the world in which "information is readily and easily accessible" and the "the need to learn" comes from the learner (Hase and Kenyon 2001). The connotation is that heutagogy is much more learner-centered even than SDL, nearly to the point of removing the teacher. However, I agree with Knowles, "that self-directed learning is the best way to learn", and there are "situations in which a person is indeed dependent in some respects" on a teacher, and "that in these situations it is appropriate for him or her to be taught or directed" (1975, pp. 10–11).

To succeed, the self-directed learner must understand principles of teaching, learning and metacognitive evaluation to assess their own learning. Thus, cognitive development constraints of the learners should be taken into consideration before approaching SDL. Motivation also plays a part in SDL, where, as Knowles states, motivating factors are "internal incentives, such as the need for esteem (especially self-esteem), the desire to achieve, the urge to grow, the satisfaction of accomplishment, the need to know something specific, and curiosity" (1975, p. 21).

How is SDL received in formal education? Longtime SDL proponent Hiemstra (2011) was puzzled about why applications of SDL such as learning contracts and individualized approaches introduced decades ago were not being implemented by many educators. As a result, he surveyed his colleagues and found that, "there will always be those in higher education that prefer to spend as little time as possible on the quality of teaching" and "outside fields of education, our doctoral programs fail to introduce burgeoning academics to the best practices of teaching and learning" (Hiemstra 2013). A

third reason given includes the limitations of time, tools and resources to train students and faculty in SDL methods and techniques.

In summary, we know what SDL is and how it focuses on putting the responsibility of learning on the individual. The difficulty lies in using a personal approach in formal education curricula for many learners on a set and sometimes-short schedule. For adults, most formal learning happens in a university, trade school, or community college setting. Using principles of SDL can mean the daunting possibility of a teacher or advisor training each student on a technique or tool to be used in SDL. If the student transfers classes, programs or schools, the new school needs to retrain the student on the new program.

So the question is not: How do we get learners to become self-directed? But, how can learners maintain their own self-direction? What tools are available to help keep learners organized? How can learners carry, control, and organize their own learning from one topic to another, from one course to another, from one school to another, from one year to another, and for the rest of their life? I propose that personal learning environments (PLEs) are one answer to these questions.

Personal Learning Environments

Students can use PLEs to become self-directed learners by tracking, organizing, and accounting for their learning. PLEs are Web 2.0 and social media technologies that enable individual learners to manage their own learning. Before we discuss examples, we should establish some guidelines for what constitute tools for use as PLEs.

Tomberg et al. (2013) give a list of the ideal guidelines to consider when looking for a PLE. Their "Perfect PLE" includes: Student centered, Collaborative, Open, Customizable, Distributed and infinite content, Compatible with standards, Mobile terminal implementation, PLEs are not persistent environments, and Bridge to educational institutions.

To simplify the list to use a PLE in SDL some of their criteria are redundant or omitted entirely from my list. "Student centered" is redundant in an SDL environment. Also, an SDL tool would be assumed "customizable" to a learner's needs and "not static" – able to change to those learning needs, but persistent enough to remain online as long as the learner needs. A Web 2.0 tool should be "compatible" with current "standards", capable on mobile devices and collect and create content throughout the vastness of the Internet. A "bridge to educational institutions" would indeed be ideal, but since most modern learning management system (LMS) packages allow links to external sources, I will omit the requirement as well. With those disclaimers and omissions accounted for, I will define my guidelines for an idea PLE tool

as: PLE tools must be easy to use, 'open', dynamic, and give options for collaboration.

PLE Tools Must be Easy to Use If a tool is difficult to learn to use, or difficult to use, people won't use it. This applies to learners, teachers and administrators alike. In this regard, the list of PLE tools discussed later include many Web 2.0 and social media tools with which many of today's learners are already familiar.

PLE Tools Must be 'Open' Tomberg et al. (2013) defined "open" as the ability to extend and expand the PLE with inherent capabilities or plug-ins. However, as I assume that any Web 2.0 tool should be supported and kept updated by the developer of said tool, my concern with openness is different.

We should consider a PLE as 'open' if it is separate from the formal LMS, school, or program sponsored software. A 'closed' LMS course with a secure login will hold the coursework that the learner adds to it, but will not allow the user to take the coursework from the LMS to other environments. The goal for this criterion is for the learner to be able to take the entirety of their work with them for later review. Another synonym for this requirement could be 'portable' – the learner can take the work performed in the PLE anywhere.

PLE Tools Must be Dynamic Tomberg et al. (2013) required that the PLE not be persistent, it should "evolve according to the learners' objectives and achievements". The requirement that it be 'dynamic' is also tied to it being 'open'. Understandably, if learners are removed from a course on an LMS site or the subscription to a software application ends they will no longer have access to their learning materials. In this case, the lesson materials and work completed needs to remain accessible.

PLE Tools Must Give Options for Collaboration Dabbagh and Kitsantas (2012) found that the ability to share the information in the PLE with others has been beneficial. However, since some PLE tools leave that option to the learner, this can not be an absolute requirement. For example, I have collected and written things within my own PLE that I would rather not share with the world. Other times, projects that I have kept private for months or years, are easily published to share as the need arises.

Examples of Personal Learning Environments

Given the guidelines above, let us discuss some examples of PLEs or Web 2.0 applications that can be considered as PLE tools. Also, this is not intended to be an exhaustive list but should illustrate some strengths and weaknesses of different types of tools as PLEs. The guiding principles of PLEs are that

they should be easy to use, open, dynamic, and offer collaboration options.

Google Account as a PLE A Google account can function as a personal learning environment because it is fairly easy to use, dynamic, lasting as long as the learner desires to use it and offers collaboration. This could be an easy tool to use as a PLE especially in cases where the university has adopted Google accounts as the interface for university mail and communication. Tools included in the Google suite that can be included in consideration as a PLE are Google Drive for file storage and sharing; Google Docs for collaborative work; Gmail for communication and RSS feeds; Google + for social interaction, bookmarking, news, interest updates, group communication and sharing work; YouTube for instructional videos, recorded lectures and sharing video content; Google Hangouts for live meetings and tutor sessions; Google scholar for research and Google search engine for research and general searching.

Blog as a PLE A blog, short for web log, is a web-based diary on which a user may post an article of his or her creation and other users may comment or even contribute as authors to the blog. A blog account may be set up for free at various hosting services such as Blogspot.com, WordPress.com, or other websites. Blogs can include writings, images, videos, and other linked media. Another benefit of common blogging software is the ability to 'tag' content with keywords called tags. These tags become topics that are searchable for the blog's creator or other visiting users. Blogs also allow sorting by date and category, so the learner can keep organized and updated. In an SDL setting, a learner might create a blog with topics for each research area of interest and refer back to it as needed. In a formal instructional activity, learners may be asked to create and submit for evaluation a blog post with content based on specified criteria.

Microblogging as a PLE Microblogging is similar to blogging in that users post their own content created for various topics of interest. The defining point of microblogging is the shorter length associated with blog posts and the higher frequency of posts because of the post length. Twitter.com and Tumblr.com are two options for microblogging, but many other social media platforms such as Facebook.com allow a microblogging-inspired status update. Like blogging, microblogging sites allow commenting and tagging features, only with different functionality and each is hosted on a single website. Twitter.com, for example allows users to "follow" others who tend to post items of interest, resulting in updates on the following user's feed. Users can reply and share by "retweeting" others' posts, and can tag other users by inserting usernames to share. Further, tagging of topics is facilitated by 'hashtags', which are topics, names, or short phrases such as #singer, #justinbieber, or #learningnewthingseveryday. In an

SDL or formal learning activity, microblogging could be used to track news on a topic, location, or upcoming event with learners contributing or sharing and reporting back to their classmates.

Image Sharing as a PLE Image-sharing is an area of social media that is great as a PLE for SDL. In image-sharing sites, such as Instagram.com, Imgur.com, Pinterest.com, Flickr.com, Photobucket.com, and DeviantArt.com allow users to post original photos, videos, and other graphics and share with followers. Similar to microblogging sites, captions add depth to the content beyond the image or video and users can tag each other and topics by the same #hashtags. A sample project involving an image-sharing site might be to have learners create a collage of similar images relating to an instructional topic. In an SDL example, a mechanic might share a picture of a problem with a vehicle in repair and ask the community for advice on how to proceed.

Wiki as a PLE A wiki is a website that allows collaborative editing of its content and structure by users. The most common wiki is that found at Wikipedia.com, but there are many different wikis, each with different topics of interest, such as the Star Wars-focused Wookiepedia at starwars.wikia.com. With a wiki as a PLE, users could collaborate in defining the topic structure and creating the information content of the topic. This wiki could be kept private to the user, the group, or made public to the world.

Personal Website as a PLE A personal website can range among the more difficult options for a PLE, but as skillsets of learners can vary enough to consider this as an option. There are free and turnkey options for website setup and many website hosting companies offer site-builder applications. One benefit of a personal website as a PLE is the ability to include wikis, blogs, portfolios, and searchable databases with which to store and showcase one's PLE.

Hard Drive or Cloud Storage as a PLE A repository or archive of files on a hard drive, USB flash-storage device, or online cloud storage is one of the most robust repository solutions as a PLE. A storage device can also function as a backup for archiving works and materials for other PLE tools. Online cloud storage is especially useful for files or projects that might be in development before sharing with peers, instructors, tutors, or the rest of the world. Another consideration for having a hard drive repository backup is for those times when the Internet is not easily accessible, such as while traveling in remote locations. This is one of my favorite PLE solutions for SDL, as I have archives of DVD storage, disk drives and online cloud backups of my work to review and share as needed for collaboration. In a formal instruction activity, a cloud storage option gives the option for many learners to access the same learning materials.

Social Bookmarking as a PLE Social bookmarking sites allow users to quickly add, share, and bookmark or catalog web-based content in a personalized manner. Since sharing content is such an integral part of many Web 2.0 social media networks, there are overlaps from other categories. Reddit.com, StumbleUpon.com, Digg.com, and Delicious.com are among the most popular behind Facebook.com, Twitter.com, Pinterest.com, Google+ and Tumblr.com. Social bookmarking sites include ratings systems in which users give added value to popular content such as likes, favorites, karma, and +1 s. Considering that many social media tools offer sharing in one form or another, the social bookmarking category is one of the largest.

SymbalooEDU as a PLE While many of the above tools could work perfectly well for a PLE in an SDL setting, SymbalooEDU is specifically designed for educational use. SymbalooEDU is the educational licensed version of Symbaloo, dubbed "Your bookmarks and favorites in the cloud", which is a social bookmarking and personal web-content organization service that includes curator features for individual learners, teachers, and school districts (Symbaloo 2015). SymbalooEDU allows the learner to store links to favorite web materials (blogs, videos, news, rss feeds, images, etc.), sorted by the user on a screen called a "Webmix". Each Webmix can be topic-specific or a collection of whatever links–called tiles–the learner chooses. SymbalooEDU allows educators and administrators to set up Webmixes for use by their learners and share them as needed. Once shared with learners, any changes to the original Webmix will be propagated throughout the screens of the learners. Webmixes may also be kept private and only viewed and edited by the learner. Setting up an account and beginning to create a Webmix full of tiles for any subject takes less than five minutes.

Marín et al. (2014) used SymbalooEDU as the PLE and home screen or starting point for all other aspects of a "Technological Tools and Resources for Teaching" course. Throughout the course, screen shots of the learners' Webmixes were evaluated. Total number of tiles (blocks or resources) that were shown in the screen shots nearly doubled from the start of the course to the end.

Implications of Personal Learning Environments

Web 2.0 technologies and tools, such as those discussed, function well as PLEs. They allow the learner to be self-directed, placing the responsibility for organizing learning on the individual. When learners take control of their own learning they become more interested and engaged, and even change their outlook on life-long learning. Many learners are already

familiar with the Web 2.0 and social media tools discussed herein.

Some cautions to be aware of with PLEs, and any technology, are to not use PLE technology just for the sake of using PLE technology. Lee (2014) examined students' perceptions of self-directed learning and collaborative learning with and without technology and discovered that the skills of SDL and collaborative learning should be taught before immersing students in technology.

> "Engaging students in [technology-based] learning can empower them, but only if they are well prepared in face-to-face environments. It would be sensible for the teachers to first help students to acquire the skills of SDL and collaborative learning before bringing them to the [technology-supported] learning environments" (Lee 2014).

Also, one should be wary of going overboard on technology software solutions as a PLE. Bullock (2013) noted from journals of teacher educators that learners seemed eager to "get their money's worth" out of technology, but also noted "it is not feasible to teach candidates how to use all the software on their computers" and "it is more desirable to teach future teachers how to learn with and from digital technologies".

Implementation of Personal Learning Environments for Diverse Learners

Given the benefits of SDL, what PLEs are and some examples of PLEs, how might PLEs be used in each of following learning areas?

Application of PLEs for Distance Education As with the study by Marín et al. (2014), the PLE may be used as the interface from which all other content and contact stems. A PLE also allows learners to add their own sources to the course materials as they do their own research.

Application of PLEs for Instructional Designers ID professionals may use PLEs to prepare external sources to share and allow learners to learn by adding to them with a little scaffolding. If designers are aware of the appropriate PLE tools available and vetted by the institution they will be better able to make beneficial suggestions for their use in curriculum design.

Application of PLEs for Educators Educators may use PLEs as a solution for building and tracking a portfolio of resources from their learners. In the example of SymbalooEDU, educators may also prepare complete

Webmixes of resources for a specific topic and share with learners as they advance through a course.

Application of PLEs for Students and Parents If a school has prepared or chosen a PLE, parents may be able to follow with the student to know what material he or she is studying at a given time. This will also be helpful when students ask parents for help with homework: parents will be able to view the same material to better know how to help.

Application of PLEs for Homeschoolers PLEs give home-school families and groups the ability to control and manage learning without expensive or difficult learning management systems.

Application of PLEs for Life-Long Learners Life-long learners will be able to use PLEs to curate and maintain resources of learning, interests, hobbies, etc. They will also be able to create, monitor and accomplish their own learning objectives without requiring any accountability to formal organizations or groups, but will have a portfolio of work in cases where such would be required.

Possibilities for Future Research

PLEs are a fairly new concept, but as technology continues to advance and change the landscape of possibility for learners, PLEs will need to be adapted to new situations. While some research has been performed on teacher control of the PLE (Tomberg et al. 2013), concerns regarding the effectiveness of different PLE tools from a learner's perspective, concerns about student privacy, identity and academic integrity through PLEs still warrant future research.

Conclusion

As the proverbial statement suggests, "Give a man a fish, he'll eat for a day. Teach a man to fish, he'll eat for the rest of his life" consider teaching him how to use a personal learning environment so he can take control of his own learning to be able to learn to fish, hunt, gather, farm or anything else he wants to learn and he'll be able to learn, share and teach others.

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